IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SMART RF INC.,	§	
	§	
Plaintiff,	§	
	§	
v.	§	Case No. 2:24-CV-00195-JRG
	§	(LEAD CASE)
AT&T MOBILITY LLC,,	§	
	§	
Defendant.	§	

CLAIM CONSTRUCTION ORDER

On June 12, 2025, the Court held a hearing to determine the proper construction of the disputed claim terms in U.S. Patent Nos. 7,035,345 (the "'345 Patent"); 8,767,857 (the "'857 Patent"); 9,641,204 (the "'204 Patent"); and 10,958,296 (the "'296 Patent") (collectively the "Asserted Patents"). Having reviewed the arguments made by the parties at the hearing and in their claim construction briefing (Dkt. Nos. 67, 71, 75)[1], having considered the intrinsic evidence, and having made subsidiary factual findings about the extrinsic evidence, the Court hereby issues this Claim Construction Order. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *see also Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

[1] Citations to the parties' filings are to the filing's number in the docket (Dkt. No.) and pin cites are to the page numbers assigned through ECF.

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I. BACKGROUND

Plaintiff Smart RF, Inc. alleges that Defendants AT&T Mobility LLC, Cellco Partnership d/b/a Verizon Wireless and T-Mobile USA, Inc., along with Intervenor Defendants Ericsson Inc. and Nokia of America Corporation (collectively, "Defendants") infringe the Asserted Patents. Shortly before the start of the June 12, 2025 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties' arguments and facilitating discussion.

The '345 Patent, titled "Adaptive Predistortion Device and Method Using Digital Receiver," was filed on June 8, 2001, and issued on April 25, 2006. The '345 Patent relates to "predistortion using digital receivers." '345 Patent at 1:8–9.

The Abstract of the '345 Patent states:

> An advanced adaptive baseband/RF predistorting device, which advantageously uses the concept of digital receiver technology into power amplifier (PA) linearization area. The predistorting device performs an instantaneous characterization of the PA using two digital receivers to supply its dynamic AM-AM and AM-PM transfer functions used to synthesize Look-Up Tables (LUT) which implement the complex predistortion function in order to compensate for any non-linearity and memory effects.

Claim 1 of the '345 Patent is an illustrative claim and recites the following elements (disputed terms in italic):

> 1.An adaptive method for predistorting an RF modulated signal, to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said method comprising the steps of:
> predistorting the RF modulated signal to be transmitted using an I/Q modulator interposed between the signal source and the input of the power amplifier, and controlled by means of amplitude and phase look-up tables stored in a distorting generator;
> producing, via a first *digital receiver*, a first feedback signal in response to the RF predistorted signal;
> producing, via a second *digital receiver*, a second feedback signal in response to the RF amplified output signal from the power amplifier;

> modeling the power amplifier in response to the first and second feedback signals; and
> updating the predistortion amplitude and phase look-up tables in response to said modeling of the power amplifier,
> wherein said second feedback signal includes the complex envelope of the RF amplified output signal, and
> wherein said modeling step includes the discrimination of the complex envelope of the first feedback signal referenced to the complex envelope of the second feedback signal to yield a predistortion function correlated to a behaviour of the power amplifier including nonlinearities and memory effects.

The '857 Patent, titled "Multi-Cell Processing Architectures for Modeling and Impairment Compensation in Multi-Input Multi-Output Systems," was filed on May 14, 2010, and issued on July 1, 2014. The '857 Patent "relates to the field of wireless communications, and more specifically, to the distortions and impairment's corrections of Multiple Input Multiple Output (MIMO) systems with linear and nonlinear components and unwanted interactions and correlations between multiple input signals." '857 Patent at 1:15–21.

The Abstract of the '857 Patent states:

> The present invention relates to a method for multiple-input multiple-output impairment pre-compensation comprising: receiving a multiple-input signal; generating a pre-distorted multiple-input signal from the received multiple-input signal; generating a multiple-output signal by feeding the pre-distorted multiple-input signal into a multiple-input and multiple-output transmitter; estimating impairments generated by the multiple-input and multiple-output transmitter; and adjusting the pre-distorted multiple-input signal to compensate for the estimated impairments. The present invention also relates to a pre-compensator for use with a multiple-input and multiple-output transmitter, comprising: a multiple-input for receiving a multiple-input signal; a matrix of pre-processing cells for generating a pre-distorted multiple-input signal from the received multiple-input signal; and a multiple-output for feeding the pre-distorted multiple-input signal to the multiple-input and multiple-output transmitter. The pre-processing cells are configured so as to estimate impairments generated by the multiple-input and multiple-output transmitter and adjust the pre-distorted multiple-input signal to compensate for the estimated impairments.

Claim 1 of the '857 Patent is an illustrative claim and recites the following elements

(disputed terms in italic):

> 1.A method for multiple-input multiple-output impairment pre-compensation comprising:
> receiving a plurality of input signals forming a multiple-input signal in a multiple-input multiple-output system;
> generating a pre-distorted multiple-input signal from the received multiple-input signal;
> generating a multiple-output signal by feeding the pre-distorted multiple-input signal into a multiple-input and multiple-output transmitter;
> estimating impairments generated by the multiple-input and multiple-output transmitter, the impairments comprising *nonlinear crosstalk between distinct ones of the plurality of input signals*; and
> adjusting the pre-distorted multiple-input signal to compensate for the estimated impairments, wherein generating the pre-distorted multiple-input signal comprises feeding the received multiple-input signal to a matrix of pre-processing cells, comprising, in each of the pre-processing cells of the matrix:
> nonlinear processing blocks compensating for multiple-input multiple-output nonlinear distortions and an effect of interferences between signal paths of the multiple-input signal and signal paths of the multiple-output signal; and
> linear processing blocks compensating for the multiple-input multiple-output linear distortions and the effect of interferences between the signal paths of the multiple-input signal and the signal paths of the multiple-output signal.

The ’204 and ’296 Patents are titled “Digital Multi-Band Predistortion Linearizer with Non-linear Subsampling Algorithm in the Feedback Loop,” share the same specification, and have the same inventors. The ’204 Patent was filed on August 25, 2014, and issued on May 2, 2017. The ’296 Patent was filed on May 1, 2017, and issued on March 23, 2021. The ’204 and ’296 Patents generally relate to “to multi-band digital predistortion linearization.” ’204 Patent at 1:25–26, ’294 at 1:27–28. The ’296 Patent is a continuation of the ’204 Patent.

The Abstract of the ’204 and ’296 Patents states:

> A concurrent multi-band linearized transmitter (CMLT) has a concurrent d a multi-band predistortion block (CDMPB) and a concurrent multi-band transmitter (CMT) connected to the CDMPB, The CDMPB can have a plurality of digital baseband signal

> predistorter blocks (DBSPBs), an analyzing and modeling (A&M) stage, and a signal observation feedback loop. Each DBSPB can have a plurality of inputs, each corresponding to a single frequency band of the multi-band input signal, and its output corresponding to a single frequency band; each output connect corresponding to an input of the CMLT. The A&M stage can have a plurality of outputs connected to and updating the parameters of the DBSPBs, and a plurality of inputs connected to either both outputs of the signal observation loop or the output of the subsampling loop and to outputs of the DBSPBs. The A&M stage can perform signals' time alignment, reconstruction of signals and compute parameters of DBSPBs.

Claim 1 of the ’204 Patent is an illustrative claim and recites the following elements (disputed term in italic):

> 1.A transmitter comprising:
> a power amplifier configured to amplify modulated concurrent multi-band signals to provide amplified concurrent multi-band signals;
> a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals to compensate for a non-linearity of the power amplifier; and
> a signal observation feedback loop *configured to effect concurrent sampling of the amplified concurrent multi-band signals* at a subsampling frequency lower than twice a highest signal frequency in the amplified concurrent multi-band signals.

Claim 1 of the ’296 Patent is an illustrative claim and recites the following elements (disputed terms in italic):

> 1.A linearized transmitter comprising:
> a digital signal predistorter block including digital baseband signal predistorters *effecting predistortion of concurrent input signals to output concurrent predistorted signals;*
> a power amplifier block connected to amplify the predistorted signals; and
> an analyzing and modelling stage receiving first feedback signals taken from an output of the power amplifier, and *second feedback signals taken concurrently from the concurrent predistorted signals* and using the first feedback and the second feedback signals in the analyzing and modelling stage to model a nonlinearity in the power amplifier, wherein the

> digital baseband signal predistorters are updated by the analyzing and modelling stage.

II. APPLICABLE LAW

A. Claim Construction

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *Id.* at 1313; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. The general rule—subject to certain specific exceptions discussed *infra*—is that each claim term is construed according to its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003); *Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347 (Fed. Cir. 2014) (quotation marks omitted) ("There is a heavy presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.") *cert. granted, judgment vacated,* 135 S. Ct. 1846 (2015).

"The claim construction inquiry . . . begins and ends in all cases with the actual words of the claim." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998). "[I]n all aspects of claim construction, 'the name of the game is the claim.'" *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014) (quoting *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)) *overruled on other grounds by Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed.

Cir. 2015). First, a term's context in the asserted claim can be instructive. *Phillips*, 415 F.3d at 1314. Other asserted or unasserted claims can also aid in determining the claim's meaning, because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id*. at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id*. (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id*.

The specification may also resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex, Inc.*, 299 F.3d at 1325. But, "'[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.'" *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. "[I]t is improper to read limitations from a preferred

embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

The prosecution history is another tool to supply the proper context for claim construction because, like the specification, the prosecution history provides evidence of how the U.S. Patent and Trademark Office ("PTO") and the inventor understood the patent. *Phillips*, 415 F.3d at 1317. However, "because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* at 1318; *see also Athletic Alts., Inc. v. Prince Mfg.*, 73 F.3d 1573, 1580 (Fed. Cir. 1996) (ambiguous prosecution history may be "unhelpful as an interpretive resource").

Although extrinsic evidence can also be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are not helpful to a court. *Id*. Extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id*. The Supreme Court has explained the role of extrinsic evidence in claim construction:

> In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for

> example, the background science or the meaning of a term in the relevant art during the relevant time period. *See, e.g., Seymour v. Osborne*, 11 Wall. 516, 546 (1871) (a patent may be "so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning"). In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the "evidentiary underpinnings" of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.

Teva Pharm. USA, Inc. v. Sandoz, Inc., 574 U.S. 318, 331–32 (2015).

B. Departing from the Ordinary Meaning of a Claim Term

There are "only two exceptions to [the] general rule" that claim terms are construed according to their plain and ordinary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution."[2] *Golden Bridge Tech., Inc. v. Apple Inc.*, 758 F.3d 1362, 1365 (Fed. Cir. 2014) (quoting *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)); *see also GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("[T]he specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."). The standards for finding lexicography or disavowal are "exacting." *GE Lighting Sols.*, 750 F.3d at 1309.

To act as his own lexicographer, the patentee must "clearly set forth a definition of the disputed claim term," and "clearly express an intent to define the term." *Id.* (quoting *Thorner*, 669 F.3d at 1365); *see also Renishaw*, 158 F.3d at 1249. The patentee's lexicography must appear "with reasonable clarity, deliberateness, and precision." *Renishaw*, 158 F.3d at 1249.

[2] Some cases have characterized other principles of claim construction as "exceptions" to the general rule, such as the statutory requirement that a means-plus-function term is construed to cover the corresponding structure disclosed in the specification. *See, e.g., CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002).

To disavow or disclaim the full scope of a claim term, the patentee's statements in the specification or prosecution history must amount to a "clear and unmistakable" surrender. *Cordis Corp. v. Bos. Sci. Corp.*, 561 F.3d 1319, 1329 (Fed. Cir. 2009); *see also Thorner*, 669 F.3d at 1366 ("The patentee may demonstrate intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope."). "Where an applicant's statements are amenable to multiple reasonable interpretations, they cannot be deemed clear and unmistakable." *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

C. Definiteness under 35 U.S.C. § 112 ¶ 2 (pre-AIA) / § 112(b) (AIA)

Patent claims must identify with specificity and claim distinctly the subject matter regarded as the invention. 35 U.S.C. § 112 ¶ 2. A claim, when viewed in light of the intrinsic evidence, must "inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910, 134 S.Ct. 2120, 189 L.Ed.2d 37 (2014). If it does not, the claim fails § 112 ¶ 2 and is therefore invalid as indefinite. *Id.* at 901. Whether a claim is indefinite is determined as of the time the application for the patent was filed. *Id.* at 911. As it is a challenge to the validity of a patent, the failure of any claim in suit to comply with § 112 must be shown by clear and convincing evidence. *Id.* at 912 n.10. "[I]ndefiniteness is a question of law and in effect part of claim construction." *ePlus, Inc. v. Lawson Software, Inc.*, 700 F.3d 509, 517 (Fed. Cir. 2012).

For instance, when a term of degree is used in a claim, "the court must determine whether the patent provides some standard for measuring that degree." *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (quotations omitted). Likewise, when a subjective term is used in a claim, "the court must determine whether the patent's specification supplies some standard for measuring the scope of the [term]." *Datamize, LLC v. Plumtree Software, Inc.*,

417 F.3d 1342, 1351 (Fed. Cir. 2005); *accord Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370–71 (Fed. Cir. 2014) (citing *Datamize*, 417 F.3d at 1351).

III. CONSTRUCTION OF AGREED TERMS

The parties did not provide the Court with any agreed to constructions. (Dkt. No. 62 at 2).

IV. CONSTRUCTION OF DISPUTED TERMS

The parties dispute the meaning and scope of six terms or phrases in the Asserted Patents. Each dispute is addressed below.

A. "digital receiver"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"digital receiver"	Plain and ordinary meaning, "a component that receives a digital signal"	"device that digitally translates a signal from RF to complex baseband" Alternatively "device that digitally translates a signal to complex baseband"

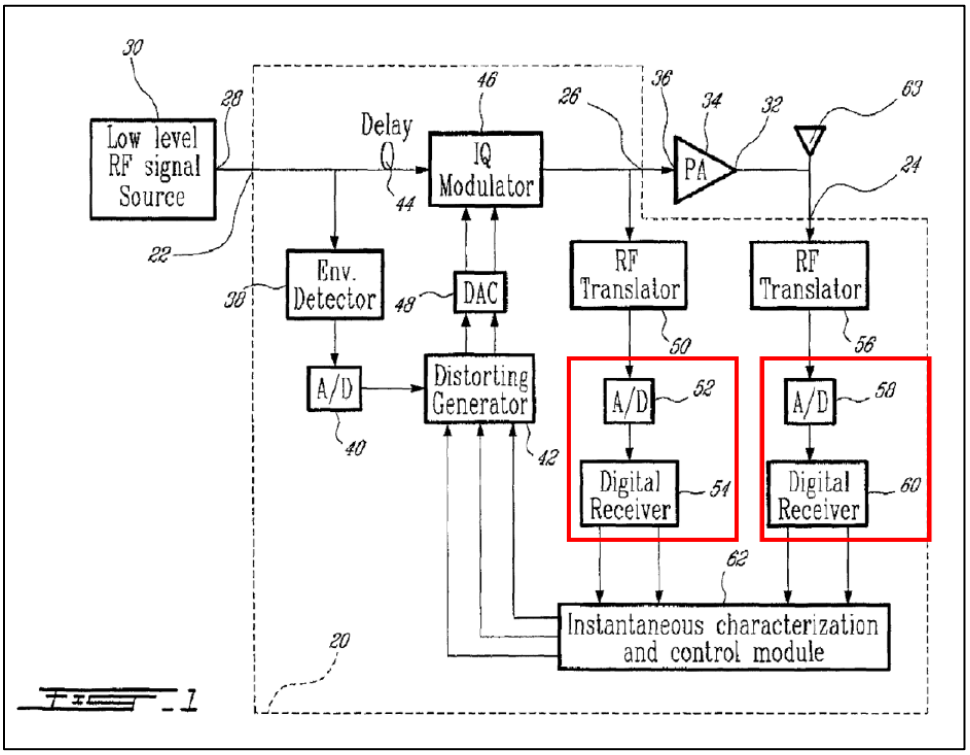
1. Analysis

The term "digital receiver" appears in Asserted Claims 1, 3, 5, and 7-11 of the '345 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The parties dispute two issues for the term "digital receiver."[3] The first issue is whether the "digital receiver" must first translate an RF signal. Plaintiff argues that Defendants' construction improperly limits the claimed "digital receiver" to a device that receives and translates an RF signal (a type of analog signal). (Dkt. No. 67 at 10). Plaintiff contends that a "digital receiver" receives a digital input, and a construction that requires a digital receiver to

[3] The parties' arguments for this disputed term can be found in Plaintiff's Opening Claim Construction Brief (Dkt. No. 67 at 9-12); Defendants' Responsive Claim Construction Brief (Dkt. No. 71 at 11-17); and Plaintiff's Reply Claim Construction Brief (Dkt. No. 75 at 4-6).

receive an analog RF signal is improper. *Id.* at 10. Plaintiff further argues that this construction would exclude numerous embodiments that repeatedly show analog to digital converters as the sole input to the digital receiver. *Id.* (citing '345 Patent at Figures 1, 2, 4A, 4B, 13, 14).

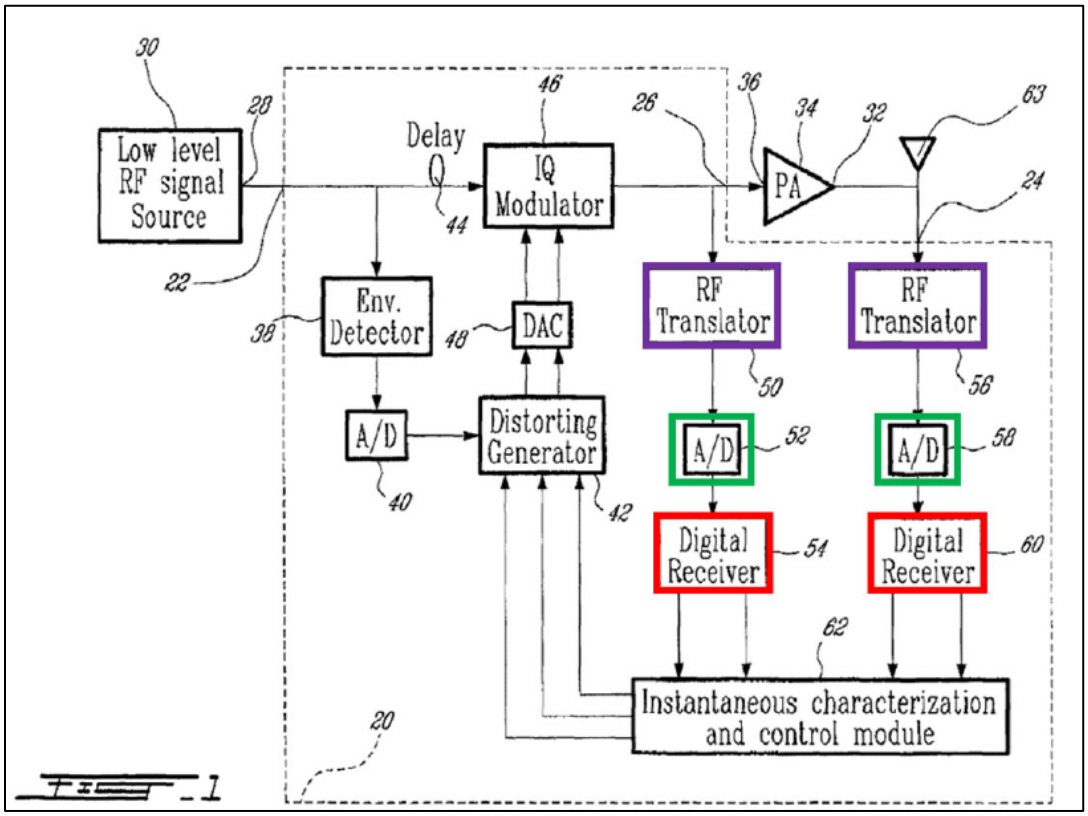
The Court agrees that the disclosed embodiments show the digital receiver receives a digital signal, and not an RF modulated signal (*i.e.*, an analog signal). For example, the specification discusses using an analog to digital converter (A/D converter) to supply "digital samples" to the digital receiver. '345 Patent at 5:59-60 ("The digital samples from the A/D converter 52 are supplied to a digital receiver 54."). This is illustrated in Figure 1 as follows:



'345 Patent at Figure 1 (annotated). Accordingly, the Court adopts Plaintiff's construction that specifies that the "digital receiver" is a "component that receives a digital signal."

Defendants respond that the parties agree that an RF signal is an analog signal, and that a digital signal is a numerical representations of an analog signal. (Dkt. No. 71 at 9). Defendants contend that the "digital receiver" is the final step in a three-step process that translates an analog

RF signal to a form suitable for modeling the Power Amplifier's ("PA") distortive effects. *Id.* at 12. Referring to Figure 1 (below), Defendants argue that an RF translator (purple) first converts the signal samples to a suitable frequency range, but the signal remains an analog signal. *Id.* at 13 (citing '345 Patent at 5:52–62). Defendants further argue that the analog signal samples are converted to digital data by an A/D converter (green). (Dkt. No. 71 at 13) (citing '345 Patent at 5:52–62). Defendants next argue that the "digital samples from the A/D converter 52 are supplied to a digital receiver 54" (red) for "complex down converting." (Dkt. No. 71 at 13) (citing '345 Patent at 5:52–62).



'345 Patent at Figure 1 (annotated). In a footnote, Defendants state that "the words 'from RF' in Defendants' construction are intended to reflect the fact that the 'digital receiver' is part of a process that takes what started as an RF signal and translates that RF signal into complex baseband." (Dkt. No. 71 at 11, n. 6). Defendants further state that they "do not suggest that a

digital receiver requires an analog input and therefore must be the component that directly converts an analog signal to the digital domain." *Id.* To that end, Defendants provide an alternative construction that removes the words "from RF." To remove any ambiguity regarding this first issue, the Court construes the term "digital receiver" as a "component that receives a digital signal." This is consistent with both parties' arguments, and resolves the parties' first dispute.

The second issue the parties dispute is whether the "digital receiver" must translates the signal to complex baseband. The parties do not dispute "that digital receivers are an important aspect of the '345 patent." (Dkt. No. 75 at 5). Plaintiff, however, argues that "there are no embodiments where a digital receiver translates from an analog RF signal to a complex baseband as Defendants' construction requires." *Id.* Plaintiff contends that when the patentees intended for a digital receiver to translate a signal to complex baseband, it explicitly said so in the claims. *Id.* (citing '345 Patent at Claim 7). According to Plaintiff, Defendants' construction would render the portion of Claim 7 that requires "down-converts the signal to be transmitted to baseband" meaningless. (Dkt. No. 75 at 5) (citing *Intel v. Qualcomm*, 21 F.4th 801, 810 (Fed. Cir. 2021)). Plaintiff also argues that Defendants' construction is incorrect because it excludes Figure 14. (Dkt. No. 75 at 5).

The Court finds that Plaintiff's argument does not meaningfully address the second issue. The Court agrees with Plaintiff that "there are no embodiments where a digital receiver translates from an analog RF signal to a complex baseband." (Dkt. No. 75 at 5). The Court resolved that dispute by requiring the digital receiver to receive a "digital signal," as Plaintiff proposes. However, the specification indicates the digital receiver does more than simply receive a digital signal. Indeed, the specification repeatedly and consistently points to the "digital receiver's" ability to translate the digital signal to baseband as a critical inventive concept of the present

invention.

For example, the specification states the following regarding the present invention:

> Generally stated, the present invention relates to an adaptive baseband/RF predistorting device, which advantageously integrates the concept of digital receiver technology into the linearization techniques, and to a method therefor. *By taking advantage of the digital receiver technology to digitally translate signal from RF to baseband with very high accuracy, the predistorting device of the present invention performs the instantaneous characterization of the memoryless nonlinearity in baseband to supply a correlated predistortion function*. The distortion is generated in baseband by addressing the extracted predistortion function and then, the distortion is embedded into the RF signal by dynamically adjusting the amplitude and the phase of the carrier.

'345 Patent at 5:4–16 (emphasis added). Figure 2 illustrates the inner operations of the digital receiver and how it does more than simply receive "a digital signal as input."

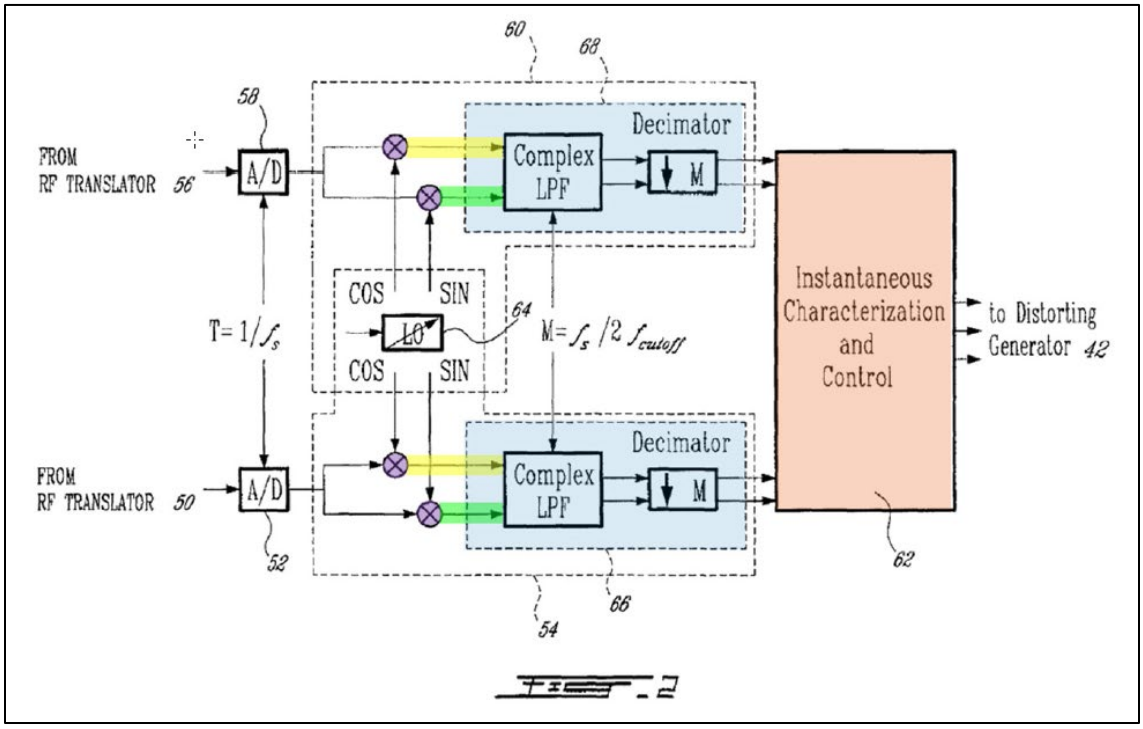


FIG. 2

'345 Patent at Figure 2 (annotated). Specifically, Figure 2 illustrates that "[t]he entire subsequence complex down converting, filtering and decimating is performed digitally by the digital receivers 54." '345 Patent at 5:60–62. The specification explains that the digital receivers produce "complex

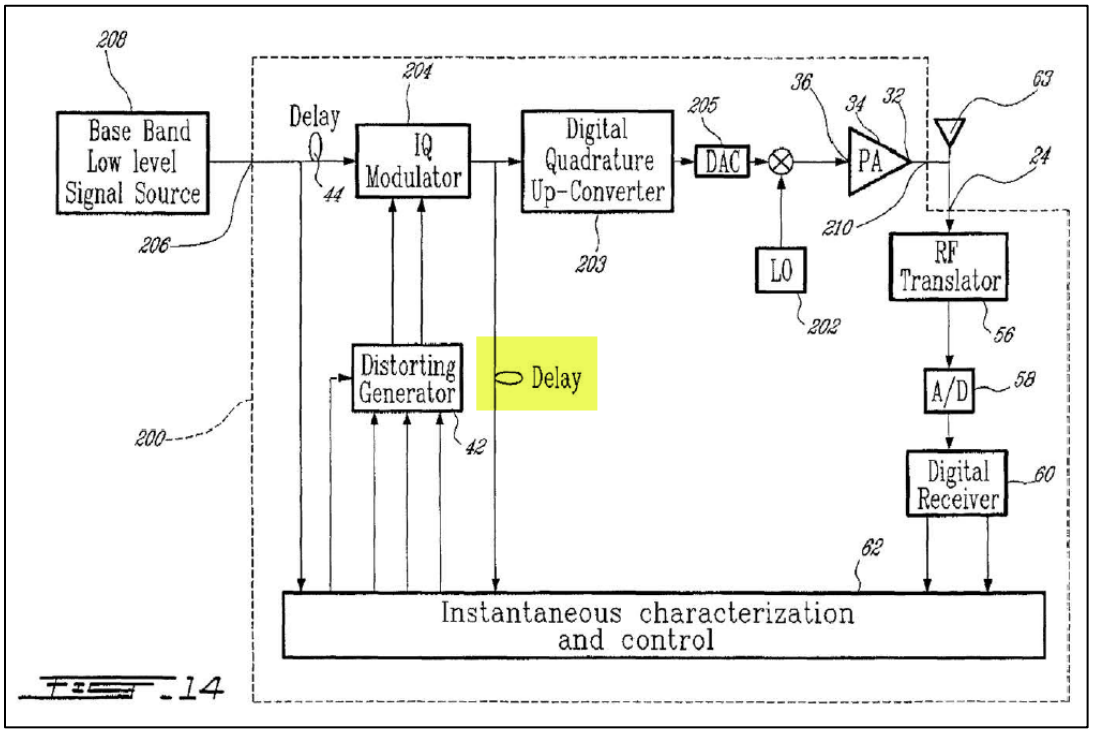
translation" by "mixing the real signal with the complex output of a digital quadrature local oscillator 64 (hereinafter 'LO')[.]" '345 Patent at 6:32–34, Figure 2 ("mixers" annotated in purple). Once the digital receiver has produced the baseband signal, the adjacent decimation filters (shown right in the blue boxes) serve to "condition the complex baseband signal" to reduce its sample rate. '345 Patent at 6:38–51. The specification indicates that "the translation and filtering process *are the two major signals processing operations performed by the digital receivers 54 and 60*." *Id.* at 6:29–31 (emphasis added). Finally, the specification indicates that it is the internal components of the claimed "digital device" that allow for "any signal" to be "selected digitally from *the RF domain and put it into the baseband domain* for further processing by the instantaneous characterization and control module 62." *Id.* at 6:52–55 (emphasis added).

Indeed, the specification states that "[t]he digital receivers allow a direct IQ demodulation in digital form from RF to baseband." *Id.* at 14:16–18. The specification indicates that this direct processing by the digital receivers completely avoids "the disturbing effect of gain and phase imbalances of a RF analogue quadrature demodulator." *Id.* at 14:16–22. Finally, the specification notes that in the prior art "linearizer designers have no access to baseband signal" in most cases. *Id.* at 2:27–29. Accordingly, the Court construes the term "digital receiver" to mean "component that receives a digital signal and translates the signal to baseband."

Turing to Plaintiff's argument, the Court is not persuaded that its construction would render the portion of Claim 7 that requires "down-converts the signal to be transmitted to baseband" meaningless. Independent Claim 7 recites three different "digital receivers," and the language Plaintiff points to is for a "third digital receiver" that appears only in one independent claim. As indicated in Claim 7, the "third digital receiver" is not the "first digital receiver" that produces "a first feedback signal in response to the RF predistorted signal from said I/Q modulator." Likewise,

the "third digital receiver" is not the "second digital receiver" that produces "a second feedback signal in response to the RF amplified output signal from the power amplifier." In other words, the construction gives meaning to the two recited "digital receivers" that actually perform the "complex translation" that the specification indicates is critical to the invention. '345 Patent at 6:28–38.

Finally, the Court disagrees that its construction excludes the embodiment disclosed in Figure 14. Plaintiff contends that Figure 14 allows for the "possibility" of a digital receiver sitting where "Delay" is located in the figure.



'345 Patent at Figure 14 (annotated). In other words, Plaintiff concedes that Figure 14 does not actually illustrate an embodiment that would be excluded by the Court's construction, but instead should be understood to allow for additional undisclosed possibilities. Importantly, Figure 14 is not the claimed invention. Specifically, the input in Figure 14 is in "Base Band" (208), which is not the claimed RF modulated signal that is predistorted in Claims 1 and 7. *See, e.g.*, '345 Patent

at Claim 1 ("predistorting *the RF modulated signal* to be transmitted") (emphasis added), Claim 7 ("distorting generator controlling said I/Q modulator to predistort *the RF modulated signal*") (emphasis added). Accordingly, the Court rejects Plaintiff's argument regarding Figure 14.

2. Court's Construction

For the reasons set forth above, the Court construes the term **"digital receiver"** to mean **"component that receives a digital signal and translates the signal to baseband."**

B. "nonlinear crosstalk between distinct ones of [a/the] plurality of input signals"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"nonlinear crosstalk between distinct ones of [a/the] plurality of input signals"	No construction necessary, plain and ordinary meaning.	"nonlinear interference between distinct ones of the plurality of input signals that is produced before passing through nonlinear components" Alternatively "nonlinear interference between distinct ones of the plurality of input signals that affects the input signals before passing through nonlinear components"

1. Analysis

The phrase "nonlinear crosstalk between distinct ones of [a/the] plurality of input signals" appears in Asserted Claims 1, 8, and 15 of the '857 Patent. The Court finds that the phrase is used consistently in the claims and is intended to have the same general meaning in each claim. The parties dispute whether the term "crosstalk" needs to be redrafted as "interference," as Defendants propose.[4] The parties also dispute whether the patentees' explicitly defined "crosstalk" to require it to "affect the input signals before passing through nonlinear components," as Defendants propose.

[4] The parties' arguments for this disputed term can be found in Plaintiff's Opening Claim Construction Brief (Dkt. No. 67 at 12-14); Defendants' Responsive Claim Construction Brief (Dkt. No. 71 at 18-22); and Plaintiff's Reply Claim Construction Brief (Dkt. No. 75 at 6-9).

The '857 Patent relates to a Multiple Input and Multiple Output (MIMO) radio that estimates "impairments generated by the multiple-input and multiple-output transmitter," and adjusts "the pre-distorted multiple-input signal to compensate for the estimated impairments." '857 Patent at Abstract. In the Background section, the specification differentiates between Multiple Input and Multiple Output (MIMO) systems and Single Input Single Output (SISO) systems. Specifically, the specification states the following:

> Also, there are unwanted and unavoidable interactions and correlations between the different signals in a MIMO system. These interactions are combined with the linear and nonlinear distortions in each branch of the MIMO system to generate more complex distortion effects, which considerably degrade the performance of the MIMO system. The effect of these complex distortions cannot be eliminated or reduced with conventional signal processing algorithms applied to Single Input Single Output (SISO) systems.

Id. at 1:59–67. The specification states that "there is a need for a signal processing technique for MIMO systems that compensates for any distortion, interactions, and crosstalk in the system in order to improve the signal quality of the transmission link." *Id.* at 2:1–4. Thus, the specification discusses estimating and compensating for various "crosstalk," "interferences," and "impairments" in a MIMO system. For example, the specification states that "[t]he digital pre-compensator 520 uses a matrix of four processing cells 515 in order to compensate for the dual branch *nonlinearities and any crosstalk and interferences (impairments)* between the two signal paths." *Id.* at 4:53–56.

Turning to the claim language, the disputed phrase appears in the phrase "estimating impairments generated by the multiple-input and multiple-output transmitter, the impairments comprising nonlinear crosstalk between distinct ones of the plurality of input signals." Thus, the claim language and specification indicate that "crosstalk" is an impairment resulting from interactions between distinct ones of the plurality of input signals in a MIMO system. In other

words, the impairment estimation needs to include nonlinear crosstalk between distinct input signals.

Defendants argue that the specification expressly defines the term "nonlinear crosstalk." (Dkt. No. 71 at 18). Defendants further argue that the patentees also limited the term "nonlinear crosstalk" to the purported definition provided in the specification. *Id.* at 18. Specifically, Defendants contend that the specification expressly defines "***nonlinear*** crosstalk" as a specific type of interference that "affects the input signals ***before it passes through nonlinear components such as 445A and 445B***." *Id.* at 19 (citing '857 Patent at 4:31–46) (emphasis in original). Defendants argue that the patentees acted as their own lexicographer, and that this definition for "nonlinear crosstalk" controls. (Dkt. No. 71 at 19).

Defendants also contend that the patentees expressly limited the term "nonlinear crosstalk" through amendments made during prosecution to overcome the prior art. *Id.* at 20. Specifically, Defendants argue that the patentees amended Claim 1 to recite:

> . . . estimating impairments generated by the multiple-input multiple-output transmitter, the impairments comprising nonlinear crosstalk between distinct ones of the plurality of input signals; and . . .

Id. (citing Dkt. No. 71-2 at 18) (underlining in original to show added claim language by amendment). Defendants further argue that the patentees expressly referenced the definition provided "at paragraph [0032]" (*i.e.*, '857 Patent, 4:31-46), when arguing to support this amendment to include "nonlinear crosstalk." (Dkt. No. 71 at 20) (citing Dkt. No. 71-2 at 26-27). Defendants contend that their construction is consistent with the patentees' argument during prosecution that "nonlinear crosstalk" is a type of crosstalk that "***affects the input signals before it passes through nonlinear components.***" (Dkt. No. 71 at 21) (citing '857 Patent at 4:31–46) (emphasis in original). According to Defendants, the prosecution history and specification make

clear that "nonlinear crosstalk" refers to a particular type of impairment that originates "before [the signal] passes through nonlinear components." (Dkt. No. 71 at 21).

"To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term, and clearly express an intent to define the term." *GE Lighting Sols.,* 750 F.3d at 1309 (internal citations omitted). Here, the specification describes examples of linear crosstalk and/or nonlinear crosstalk. '857 at 4:31–46. The specification states that "the nonlinear crosstalk 450 affects the input signals 410 before it passes through nonlinear components such as 445A and 445B." *Id.* at 4:38–40. This statement does not define nonlinear crosstalk. Instead, it describes one example of when nonlinear crosstalk can affect the input signals. Providing an example of when nonlinear crosstalk can affect a signal does not provide the "reasonable clarity, deliberateness, and precision" required for lexicography that limits the recited nonlinear crosstalk. *Renishaw*, 158 F.3d at 1249.

Regarding the prosecution history, the Court disagrees that the patentees limited the term "nonlinear crosstalk" to the example provided in the specification. First, the claim amendment identified by Defendants is the current claim language, which does not recite "nonlinear components," or that the impairment must "affect the input signals before passing through nonlinear components." Furthermore, the patentees distinguished the prior art based on the same distinction between MIMO and SISO systems disclosed in the specification. Specifically, the patentees argued that "McCallister [the prior art] neither teaches nor suggest crosstalk, let alone nonlinear crosstalk," because "McCallister teaches predistortion techniques applied to single input signals." (Dkt. No. 71-2 at 27). As discussed above, the specification stated "[t]he effect of these complex distortions cannot be eliminated or reduced with conventional signal processing algorithms applied to Single Input Single Output (SISO) systems." '857 Patent at 1:64–67.

Indeed, the patentees explicitly argued during prosecution that "since McCallister relates to a single signal path, it does not and cannot relate to crosstalk between signal paths since its signal path is unique." (Dkt. No. 71-2 at 27). The patentees further argued that "[u]nder any reasonable interpretation, any distortion occurring within this single I/Q signal cannot be deemed an effect of 'crosstalk'", because "McCallister only addresses non-MIMO related linear and nonlinear distortion." *Id.* It was because of this argument that the examiner removed the rejection, and not because the patentees explicitly argued for the definition of "nonlinear crosstalk" that Defendants propose. (Dkt. No. 71-2 at 31). Accordingly, the Court rejects Defendants' construction.

2. Court's Construction

For the reasons set forth above, the Court construes the phrase **"nonlinear crosstalk between distinct ones of [a/the] plurality of input signals"** to mean **"nonlinear impairment resulting from interactions between distinct ones of the plurality of input signals."**

C. "configured to effect concurrent sampling of the amplified concurrent multi-band signals"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"configured to effect concurrent sampling of the amplified concurrent multi-band signals"	No construction necessary, plain and ordinary meaning.	"configured to concurrently sample the amplified concurrent multi-band signals"

1. Analysis

The phrase "configured to effect concurrent sampling of the amplified concurrent multi-band signals" appears in Asserted Claim 1 of the '204 Patent. The parties dispute whether "configured to effect" should be redrafted to imply that the recited "signal observation feedback

loop" is required to perform the concurrent sampling, as Defendants propose.[5] Plaintiff contends that the claim language only requires the signal observation feedback loop to "cause" or set into motion the concurrent sampling. (Dkt. No. 75 at 9). Specifically, Plaintiff argues that "claim 1 does not specify the component that performs concurrent sampling, instead the claim recites the element that is 'configured to effect' (or cause) the concurrent sampling." (Dkt. No. 67 at 14). Defendants argue that Plaintiff contends that "the signal observation feedback loop must only be a feature connected—in some vague, unspecified way—to the act of subsampling." (Dkt. No. 71 at 26).

Claim 1 of the '204 Patent requires a signal observation feedback loop that is "configured to effect concurrent sampling of the amplified concurrent multi-band signals." Defendants argue that the word "effect" can be a noun or a verb, and when used as a verb means to cause something to happen. (Dkt. No. 71 at 24). According to Defendants, a component that is "configured to effect" something is the component that causes something to happen and brings about the result. *Id.* Defendants contend that the plain language of the claim makes clear that it is the signal observation feedback loop that "effects" "concurrent sampling of the amplified concurrent multi-band signals." *Id.* at 24-25. Defendants further contend that their construction will help the jury more easily understand that it is the feedback loop that carries out the claimed concurrent sampling process. *Id.* at 25.

The Court first notes that Claim 1 is an apparatus claim. Specifically, the apparatus is a "transmitter" that includes a "power amplifier," a "concurrent digital multi-band predistortion block," and a "a signal observation feedback loop." Each of these elements are either "configured

[5] The parties' arguments for this disputed term can be found in Plaintiff's Opening Claim Construction Brief (Dkt. No. 67 at 14-15); Defendants' Responsive Claim Construction Brief (Dkt. No. 71 at 24-26); and Plaintiff's Reply Claim Construction Brief (Dkt. No. 75 at 9-10).

to" or "configured to effect" something. Thus, some part of the claimed transmitter must be "configured to effect concurrent sampling of the amplified concurrent multi-band signals at a subsampling frequency." The only structure described in the specification as causing or carrying out sampling (particularly "subsampling") is the signal observation feedback loop. This feedback loop is depicted in Figure 1 as containing parallel paths of bandpass filters, frequency down converters, and analog-to-digital converters. '204 Patent at 3:53–60.

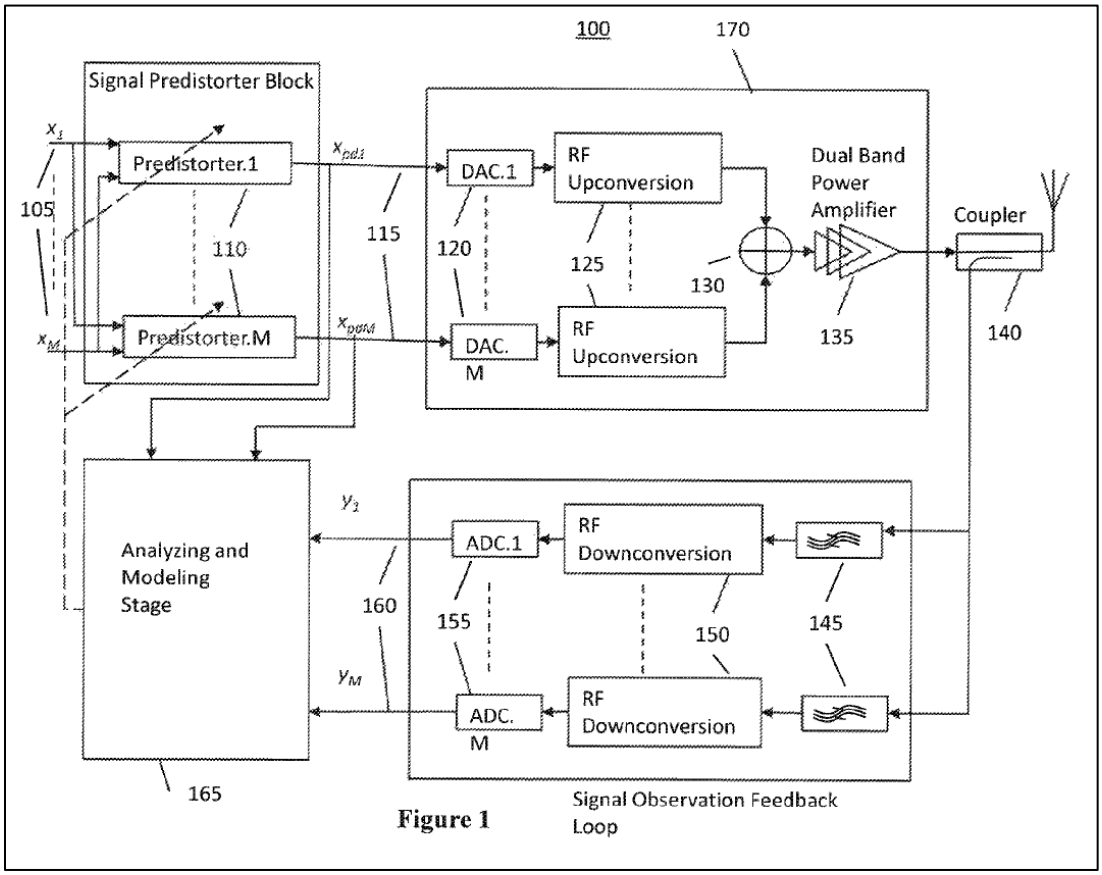


Figure 1

'204 Patent at Figure 1. In Figure 2, the feedback loop contains a bandpass filter, track and hold block, analog-to-digital converter, and digital conversion unit. *Id*. at 4:26–32.

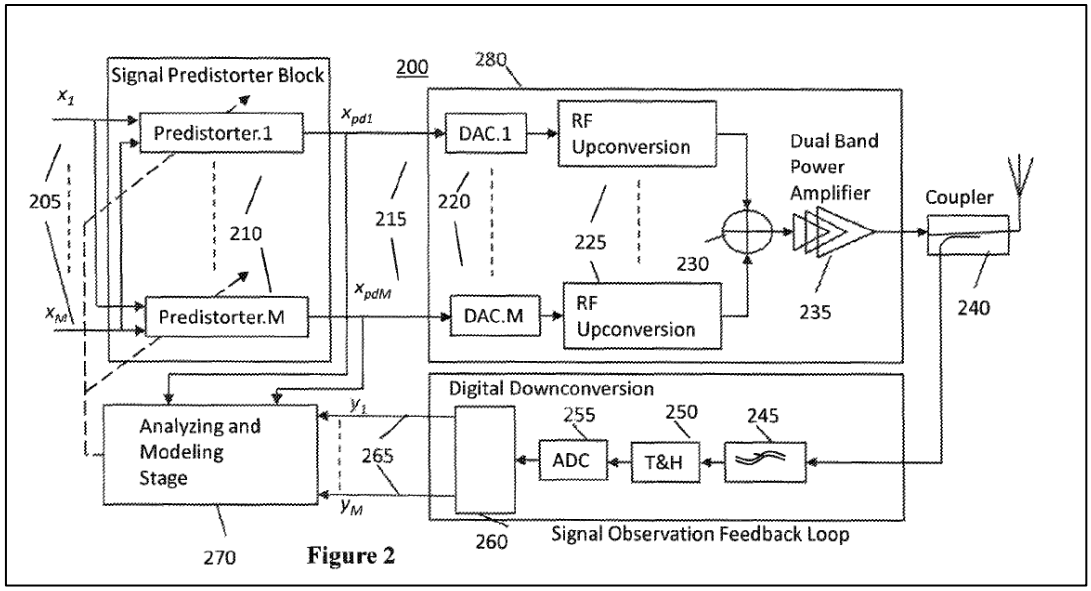


Figure 2

'204 Patent at Figure 2. The subsampling feedback loop in Figure 2 is further described with reference to Figure 3.

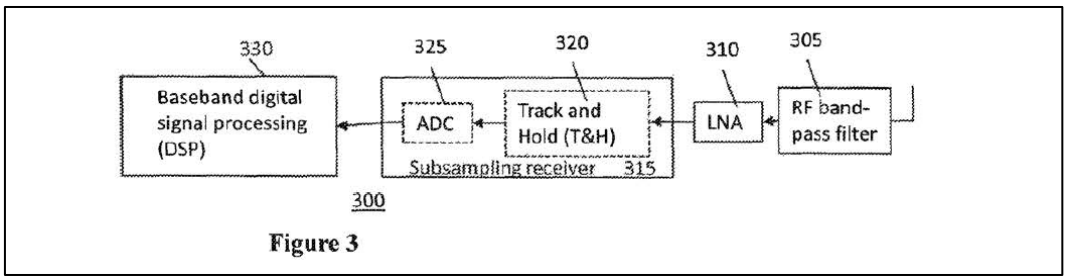


Figure 3

'204 Patent at Figure 3. The specification explains that "subsampling receiver [315] includ[es] the track and hold (T&H) 320, and ADC 325 followed by baseband digital signal processing (DSP) unit 330." *Id.* at 4:51–56. Thus, and in all instances, the signal observation feedback loop is the element that is "configured to effect" the subsampling.

To the extent that Plaintiff argues that Claim 1 does not specify the component that is "configured to effect" concurrent sampling, the Court rejects that argument. Dkt. No. 67 at 14. That said, to the extent that Defendants argue that "configure to effect" requires an action without examining how a "signal observation feedback loop" may be configured, the Court rejects that argument. As discussed, this is an apparatus claim and the recited "signal observation feedback

loop" only needs to be configured to perform the concurrent sampling to fall within the scope of the claims.

Finally, Defendants argue that the patentees' arguments during prosecution support Defendants' construction. (Dkt. No. 71 at 26) (citing Dkt. No. 71-3 at 16, 37). Plaintiff replies that Defendants' prosecution arguments are incorrect. (Dkt. No. 75 at 10). Plaintiff contends that the patentees first argued that the prior art, Suzuki, disclosed sampling of a pilot signal rather than the amplified concurrent multi-band signal. *Id.* (citing Dkt. No. 71-3 at 16). Plaintiff argues that the patentees reiterated this argument and added that Suzuki also did not teach or suggest subsampling. (Dkt. No. 75 at 10) (Dkt. No. 71-3 at 37).

The Court finds that the prosecution history does not provide additional insight as it relates to the parties' dispute. The patentees argued that the prior art did not teach or suggest "a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signal" (Dkt. No. 71-3 at 16) (emphasis in original). This is the disputed claim language. The patentees further argued that the prior art only disclosed sampling of a pilot signal. (Dkt. No. 71-3 at 16) ("Applicant submits that [sampling disclosed in FIG.6 of Suzuki] are simply sampling of quadrature components of a pilot signal."). The parties do not dispute that the claim language requires "subsampling," which is more than sampling of a pilot signal as argued by the patentees during prosecution. (Dkt. No. 71-3 at 37) ("Suzuki does not teach or suggest 'subsampling'").

2. Court's Construction

For the reasons set forth above, the phrase **"configured to effect concurrent sampling of the amplified concurrent multi-band signals"** is given its **plain and ordinary meaning**.

D. "effecting predistortion of concurrent input signals to output concurrent predistorted signals" / "second feedback signals taken concurrently from the concurrent predistorted signals"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"effecting predistortion of concurrent input signals to output concurrent predistorted signals"	No construction necessary, plain and ordinary meaning.	"effecting predistortion of two or more concurrent input signals to output from the digital signal predistorter block two or more concurrent predistorted signals"
"second feedback signals taken concurrently from the concurrent predistorted signals"	No construction necessary, plain and ordinary meaning.	"second feedback signals taken concurrently from each of the two or more concurrent predistorted signals"

1. Analysis

The phrase "effecting predistortion of concurrent input signals to output concurrent predistorted signals" appears in Asserted Claims 1 and 10 of the '296 Patent. The Court finds that the phrase is used consistently in the claims and is intended to have the same general meaning in each claim. The phrase "second feedback signals taken concurrently from the concurrent predistorted signals" appears in Asserted Claims 1 and 10 of the '296 Patent. The Court finds that the phrase is used consistently in the claims and is intended to have the same general meaning in each claim. The parties dispute whether the term "signals" must be further specified as "two or more" signals at the respective components, as Defendants propose.[6]

Defendants state that the parties agree to the following: (1) concurrent signals are signals occurring at the same time, (2) actions taken concurrently are actions taken at the same time, and

[6] The parties' arguments for this disputed term can be found in Plaintiff's Opening Claim Construction Brief (Dkt. No. 67 at 16-18); Defendants' Responsive Claim Construction Brief (Dkt. No. 71 at 27-31); and Plaintiff's Reply Claim Construction Brief (Dkt. No. 75 at 10-12).

(3) "the claims require signals occurring at the same time." (Dkt. No. 71 at 27) (citing Dkt. No. 67 at 16-17). Defendants contend that their constructions capture the true meaning of the claim terms and make the disputed phrases easier to understand for the jury. (Dkt. No. 71 at 27). Plaintiff replies that Defendants cannot credibly claim that their convoluted constructions will "help guide the jury and avoid any confusion." (Dkt. No. 75 at 11).

Defendants first argue that "the use of the plural 'input signals' conveys that what the digital signal predistorter block predistorts is two or more concurrent input signals." (Dkt. No. 71 at 28). Defendants contend that Figures 1 and 2 show at least two concurrent input signals (*i.e.*, x_1 to x_M) entering the signal predistorter block, and two concurrent output signals (i.e., x_{pd1} to x_{pdM}) exiting the signal predistorter block. *Id.* (citing '296 Patent at 3:52–57, 4:2–22, Figures 1, 2). Defendants also argue that the disclosed PA is a "concurrent multi-band power amplifier" that "includes one amplification unit for [at least] two frequency bands," which Defendants contend makes clear that when the claims talk about "concurrent signals" there must be two (or more) signals at the component specified by the claim. (Dkt. No. 71 at 29) (citing '296 Patent at 2:40–46). Defendants argue that their construction simply guides the jury that it is looking for two (or more) "concurrent" signals. (Dkt. No. 71 at 29).

Defendants also argue that the patentees confirmed during prosecution that the two or more concurrent predistorted signals recited by Claims 1 and 10 must be output from the digital signal predistorter block so that they can be concurrently input into the PA. *Id.* Defendants state that the patentees argued that the art applied by the examiner (Suzuki) "does not provide concurrent predistorted signals," because in Suzuki "the predistorted signals from each channel is summed (14A) to form a single multi-channel signal to drive the amplifier." *Id.* (citing Dkt. No. 71-4 at 54). Defendants further state that the patentees further explained that "[t]hus, Suzuki does not teach

or suggest feedback signals taken concurrently from the concurrent predistorted signals, as no concurrent predistorted signals are provided." (Dkt. No. 71 at 29) (citing Dkt. No. 71-4 at 54). Defendants contend that the patentees maintained throughout prosecution that the '296 Patent's claims were distinguishable from Suzuki on this basis. (Dkt. No. 71 at 30) (citing Dkt. No. 71-4 at 64). Finally, Defendants argue that the phrase "second feedback signals taken concurrently from the concurrent predistorted signals" should be construed as "second feedback signals taken concurrently from each of the two or more concurrent predistorted signals," for the same reasons. (Dkt. No. 71 at 30-31).

Plaintiff replies that nothing in the intrinsic record prohibits the use of a combined or composite signal to deliver concurrent signals. (Dkt. No. 75 at 11). Plaintiff contends that Figure 2 shows concurrent multiband signals being delivered to the signal observation feedback loop as a single input. *Id.* at 12. Plaintiff argues that this shows the specification contemplates using a combined or composite signal to deliver the concurrent signals. *Id.*

Regarding the prosecution history, Plaintiff argues that the patentees explained that "Suzuki does not provide concurrent predistorted signals" because "[i]n Suzuki the predistorted signals from each channel is summed (14A) to form a single multi-channel signal to drive the amplifier." (Dkt. No. 75 at 12) (citing Dkt. No. 71-4 at 54). In other words, the patentees explained that summing predistorted signals does not yield concurrent predistorted signals. (Dkt. No. 75 at 12). Plaintiff contends that the patentees did not declare that the concurrent predistorted signals that drive the power amplifier could not be combined or composite signals. *Id.*

The Court agrees with Plaintiff. As noted by Plaintiff, the specification expressly discloses combining predistorted signals to drive the power amplifier. '296 Patent at 3:56–57 ("[T]he two RF signals are combined 130 and amplified by the power amplifier 135."). Similarly, Figure 2

shows concurrent multiband signals being delivered to the signal observation feedback loop as a single input 240, where digital conversion unit 260 subsequently separates this input into its respective components.

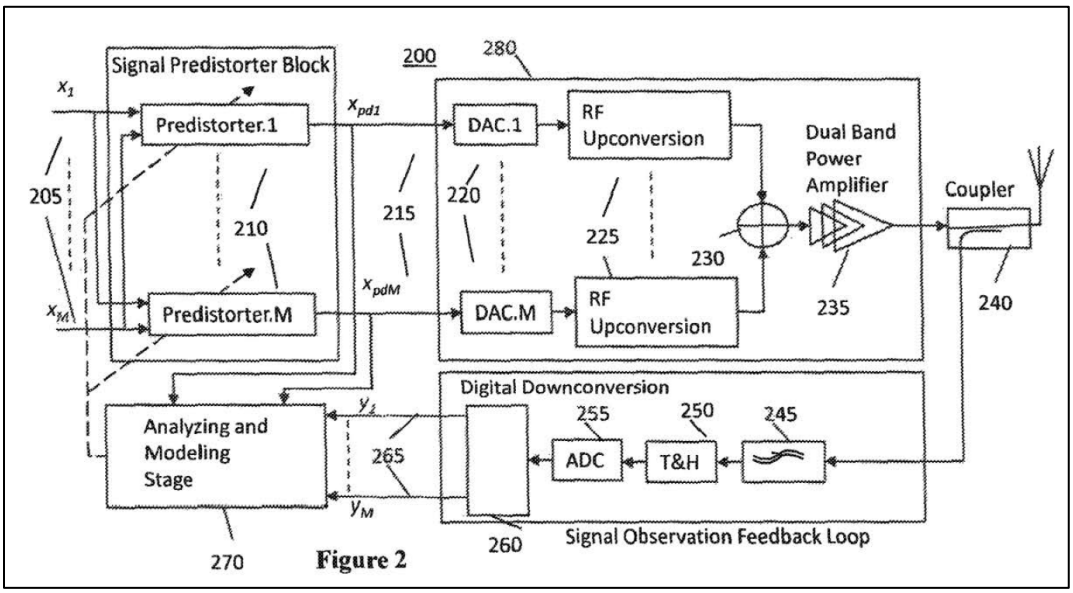


Figure 2

'296 Patent at Figure 2. Likewise, the patentees did not argue during prosecution that the concurrent predistorted signals that drive the power amplifier could not be combined or composite signals. Instead, the patentees explained that "Suzuki does not provide concurrent predistorted signals" because "[i]n Suzuki the predistorted signals from each channel *is summed* (14A) to form a single multi-channel signal to drive the amplifier." (Dkt. No. 71-4 at 54) (emphasis added). In other words, the patentees explained that summing predistorted signals does not yield concurrent predistorted signals, because "summing a signal is an arithmetic operation that creates a new signal that contains the combined information or effect of individual signals and is generally irreversible." (Dkt. No. 75 at 12). Conversely, combined or composite signals may be separated into their respective components. *Id.* Accordingly, the Court finds Plaintiff's arguments persuasive.

Finally, the Court finds that Defendants' construction introduces unwarranted ambiguity

into the claims and would only confuse the jury. Whether composite or combined signals meet the claimed "signals" is a question for the fact finder. Defendants' construction of adding "two or more" does not resolve this fact issue. Instead, it only confuses the claim language.

2. Court's Construction

For the reasons set forth above, the phrases **"effecting predistortion of concurrent input signals to output concurrent predistorted signals,"** and **"second feedback signals taken concurrently from the concurrent predistorted signals"** are given their **plain and ordinary meaning**.

E. "said concurrent digital multi-band predistortion block"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"said concurrent digital multi-band predistortion block"	No construction necessary, plain and ordinary meaning. Not indefinite.	Indefinite for lack of antecedent basis.

1. Analysis

The term "said concurrent digital multi-band predistortion block" appears in Asserted Claim 2 of the '296 Patent. Defendants contend that Claim 2 is indefinite, because there is no antecedent basis for "said concurrent digital multiband predistortion block."[7] Defendants argue that the first limitation in Claim 1 recites "a digital signal predistorter block …," and Claim 2 states that "wherein *said* concurrent digital *multi-band* predistortion block further comprises…." (Dkt. No. 71 at 31). Defendants contend that the introductory word "said" before "concurrent digital *multi-band* predistortion block" in Claim 2 should appear in Claim 1 for antecedent basis support. *Id.* Defendants argue that there is no "concurrent digital multi-band predistortion block" recited in

[7] The parties' arguments for this disputed term can be found in Plaintiff's Opening Claim Construction Brief (Dkt. No. 67 at 18-20); Defendants' Responsive Claim Construction Brief (Dkt. No. 71 at 31-34); and Plaintiff's Reply Claim Construction Brief (Dkt. No. 75 at 13).

Claim 1. *Id.* at 31-32.

Defendants further argue that the "digital signal predistorter block" cannot provide antecedent basis because the patentees amended Claim 1 during prosecution to remove "multi-band" from the "digital signal predistorter block." *Id.* at 32. Defendants also argue that Plaintiff kept the language of "said concurrent digital multi-band predistortion block" in Claim 2, despite removing "multi-band" from the "linearized transmitter" in Claim 2. *Id.* at 32. Defendants contend that the file history evidences a clear intent on the part of patentees to keep Claim 2's predistortion block as a "multi-band" block, which renders the claim indefinite. *Id.* at 33.

Defendants further contend that this similarly leaves one of ordinary skill without any reasonable way to ascertain whether (1) Claim 2 introduces a new predistortion block as compared to Claim 1, which must also be a multi-band predistortion block, or (2) Claim 1's predistortion block, despite patentees' prosecution amendments, must be a multi-band predistortion block based upon the language in Claim 2. *Id.* at 33. Defendants also argue that Figures 1 and 2 of the patent shows a multi-band predistortion block, and not a single-band predistortion block. *Id.* at 34 (citing '296 Patent at 3:51–52, 4:33–34). Defendants contend that there is no support for removing a multi-band requirement from the claims, as Plaintiff suggests. (Dkt. No. 71 at 34).

Plaintiff argues that the phrase "said concurrent digital multi-band predistortion block" is not indefinite, because it informs those skilled in the art about the scope of the claim with reasonable certainty. (Dkt. No. 75 at 13). Plaintiff contends that Defendants concede that "the only predistortion block referenced in claim 1 is the 'digital signal predistorter block,'" but argue that the reference to multi-band would confuse a person of ordinary skill. *Id.* (citing Dkt. No. 71 at 32).

The Court agrees with Defendants that the intrinsic evidence fails to inform "with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus v. Biosig*

Instruments, 572 U.S. 898, 901 (2014). The prosecution history confirms this finding. The patentees amended Claims 1 and 2 during prosecution as shown below.

> **1.** (Currently amended) A ~~concurrent multi-band~~ linearized transmitter comprising:
>
> a ~~concurrent~~ digital ~~multi-band predistortion~~ signal predistorter block including digital baseband signal predistorters effecting predistortion of concurrent input signals to output predistorted signals;
>
> a power amplifier block ~~a concurrent multi-band linearized transmitter~~ connected to ~~said concurrent digital multiband predistortion block.~~ amplify the predistorted signals; and
>
> an analyzing and modelling stage receiving first feedback signals taken from an output of the power amplifier, and second feedback signals taken from the predistorted signals and using the first feedback and the second feedback signals in the analyzing and modelling stage to model a nonlinearity in the power amplifier, wherein the digital baseband signal predistorters are updated by the analyzing and modelling stage.
>
> 2. (Currently amended) The ~~concurrent multi-band~~ linearized transmitter of claim 1, wherein said concurrent digital multi-band predistortion block further comprises:
>
> a plurality of the digital baseband signal predistorters each corresponding to a respective channel ~~blocks;~~
>
> ~~an analyzing and modelling stage~~; and
>
> a signal observation feedback loop for generating said first feedback signals.

Dkt. No. 71-4 at 21. As indicated, the amended first limitation in Claim 1 recites "a digital signal predistorter block …." Claim 2 states that "wherein *said* concurrent digital *multi-band* predistortion block further comprises…." *Id.* (emphasis added). The introductory word "said" before "concurrent digital *multi-band* predistortion block" in Claim 2 should appear in Claim 1 for antecedent basis support. Yet, there is no "concurrent digital multi-band predistortion block" recited in Claim 1. It is unclear why the patentees kept the language of "said concurrent digital multi-band predistortion block" in Claim 2, despite removing "multi-band" from the "linearized transmitter" in Claim 2.

The Court agrees with Defendants that the file history evidences a clear intent on the part of patentees to keep Claim 2's predistortion block as a "multi-band" block, which renders the claim indefinite. (Dkt. No. 71 at 33). This fails to inform a person of ordinary skill whether Claim 2 introduces a new predistortion block as compared to Claim 1, which must also be a multi-band predistortion block, or whether Claim 1's predistortion block must be a multi-band predistortion block based upon the language in Claim 2, despite the prosecution amendments. Further compounding the uncertainty, Figures 1 and 2 of the patent show a multi-band predistortion block, and not a single-band predistortion block. '296 Patent at 3:51–52, 4:33–34. Accordingly, the Court agrees with Defendants that there is no support for removing a multi-band requirement from the claims, as Plaintiff suggests. Accordingly, Defendants proved by clear and convincing evidence that the phrase is indefinite.

2. Court's Construction

The phrase **"said concurrent digital multi-band predistortion block"** is indefinite for failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention.

V. CONCLUSION

The Court adopts the constructions above for the disputed terms of the Asserted Patents. Furthermore, the parties should ensure that all testimony that relates to the terms addressed in this Order is constrained by the Court's reasoning. However, in the presence of the jury the parties should not expressly or implicitly refer to each other's claim construction positions and should not expressly refer to any portion of this Order that is not an actual construction adopted by the Court. The references to the claim construction process should be limited to informing the jury of the

constructions adopted by the Court.

SIGNED this 13th day of August, 2025.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE